

Economic Freedom and Foreign Direct Investment Nexus in the ECOWAS Region

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Abstract

This paper seeks to contribute to a better understanding of the relationship between *fdi* and economic freedom through the determination of the impact of economic freedom on *fdi* in the ECOWAS region, and the extent to which there are short and long run dynamics in this nexus. The data used ranged from 1995 to 2020 in a nonlinear panel ARDL setting. We found that within ECO-WAS, in the long run, a positive shock to economic freedom significantly reduced *fdi* while a negative shock to economic freedom increased *fdi*. Moreover, in the long run, both positive and negative shocks to per capita GDP had a negative impact on *fdi*. Furthermore, positive shocks to credit increased *fdi* significantly, while negative shocks to credit had no significant impact on *fdi* in both the short and long run. Urbanization had a positive and significant effect on *fdi* in the ECOWAS zone, excluding Nigeria.

Keywords

fdi, Economic Freedom, Nonlinear Panel ARDL, Cointegration, ECOWAS

1. Introduction

Foreign direct investment (*fdi*) is considered critical for economic growth and socio-economic development. Indeed, *fdi* was tagged by the World Bank as a key ingredient of successful economic growth (Klein et al., 2001). This is so because *fdi* enables and facilitates the rapid transfer, efficiency, and cross-border adoption of best practices. However, *fdi* is far from being a panacea. For *fdi* to exert its full potential in boosting economic growth a set of conditions has to be in place. Among these conditions and not least is economic freedom.

What is economic freedom? According to the Heritage Foundation, *economic*

freedom encompasses all liberties and rights of production, distribution, or consumption of goods and services. The highest form of economic freedom provides an absolute right of property ownership, fully realized freedoms of movement for labor, capital, and goods, and an absolute absence of coercion or constraint of economic liberty beyond the extent necessary for citizens to protect and maintain liberty itself (Beach & Kane, 2008). For the Fraser Institute, *individuals have economic freedom when 1) property they acquire without the use of force, fraud, or theft is protected from physical invasions by others, and 2) they are free to use, exchange, or give their property to another as long as their actions do not violate the identical rights of others* (Gwartney et al., 1996).

It is evident that *fdi* in a freedom less environment will not have the expected impact on a country's economic performance. This is so regardless of the volume of the *fdi* and the sector where it is oriented. Indeed, preconditions for successful *fdi* identified by Klein et al. (2001) included "the right environment", the existence of an equal and competitive playing field, and the existence of reasonable regulations. All these elements are parts and parcels of economic freedom.

Thus, without economic freedom, *fdi* may not be able to exert its full potential, and this could be detrimental to economic growth. Given that economic growth is a key outcome for socioeconomic development it is of utmost importance to investigate how economic freedom and *fdi* interact. Knowing such a relationship is important if we are to take actions to boost *fdi* in the ECOWAS region. The main objective of this paper is therefore to contribute to a better understanding of the relationship between *fdi* and economic freedom. More specifically, the paper seeks to: 1) determine the impact of economic freedom in the ECOWAS region, 2) the extent to which there are short and long run dynamics in this nexus.

Figure 1 and **Figure 2** below present the trend of *fdi* and per capita economic growth in the world, Sub-Saharan Africa, and ECOWAS. The trend of *fdi* in the world has not been steady (**Figure 1**). It was below 1% of GDP from early 1970 till 1994. It was only after 1994 that the ratio of *fdi* to GDP passed the 1% threshold. Then, it rose from the following to reach a peak in 2000 where it stood at 4.6%. That rise of *fdi* did not continue beyond 2000 and dropped sharply to reach 1.9% in 2003. *fdi* resumed its rise in 2004 and reached a second peak in 2007 at 5.3%. It dropped afterward due to the financial crisis in 2008 whose effect continued to 2009. Although there was a recovery after 2009, it was not enough to bring the level of *fdi* back to its 2007 level. The trend for Sub-Saharan Africa is like that of the world. *fdi* in ECOWAS followed similar trend except for the period ranging from 1988 to 1995. It could be observed that *fdi* reached a peak in 1994 a year that corresponds to the devaluation of the CFA currency. This currency is used by 8 of the 15 member States.

Looking at **Figure 2**, it is observed that the trend of per capita GDP growth for the ECOWAS region was not as erratic as that of the *fdi*. However, the visual observation does not provide enough evidence to make a firm statement on the direction of association between the two indicators. Hence the need for an in-depth investigation.

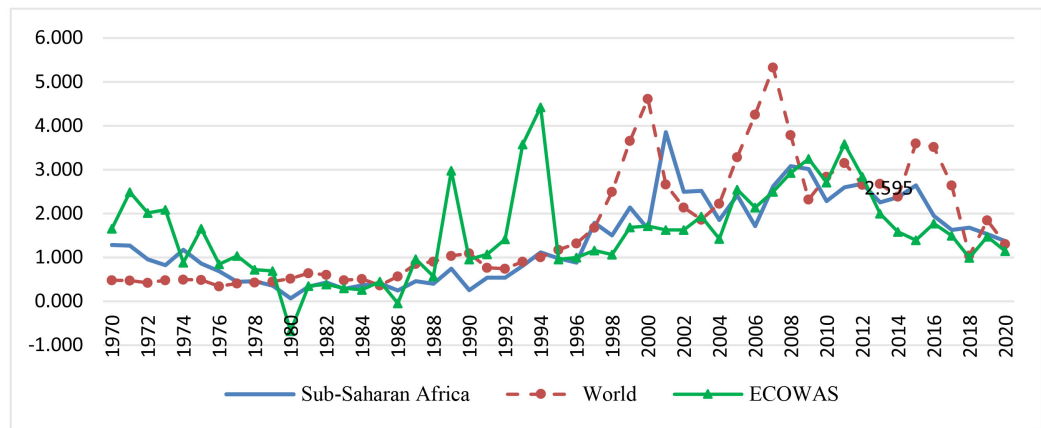


Figure 1. Trend of Foreign Direct Investment as a percentage of GDP in the world, Sub-Saharan Africa and ECOWAS from 1970 to 2020. Source: <https://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS?end=2020&start=1970&view=chart>.

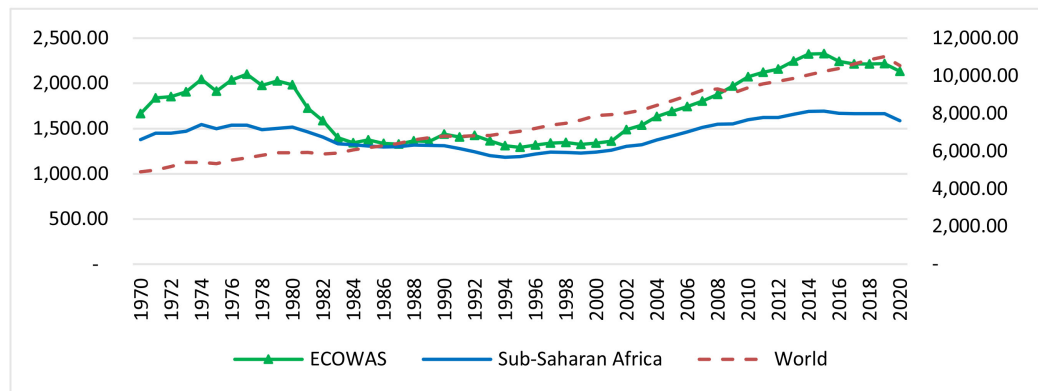


Figure 2. Trend of per capita GDP growth from 1970 to 2020. Sources: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>.

The rest of the paper is organized as follows: The next section (section 2) presents the state of economic freedom and *fdi* in the ECOWAS region. Section 3 undertakes a review of the literature. Section 4 presents the methods of analysis and the data used while section 5 presents and discusses the empirical results. The last section (section 6) concludes the paper and draws some policy implications.

2. Economic Freedom and Foreign Direct Investment: Some Stylized Facts

Figure 3 shows the evolution of the economic freedom index and the share of foreign direct investment in GDP from 1990 to 2020 for Ghana and Nigeria. Ghana's economic freedom score was higher than Nigeria's between 1990 and 2013. But as of 2013, Nigeria's share is significantly higher than Ghana's. We observe that in Nigeria from 1995 to 2005 the index of economic freedom and the *fdi* moved in the same direction but from 2005 they will move in the opposite direction. However, in Ghana, the observation of the curves does not allow to establish links between economic freedom and the share of foreign direct investment

in the GDP.

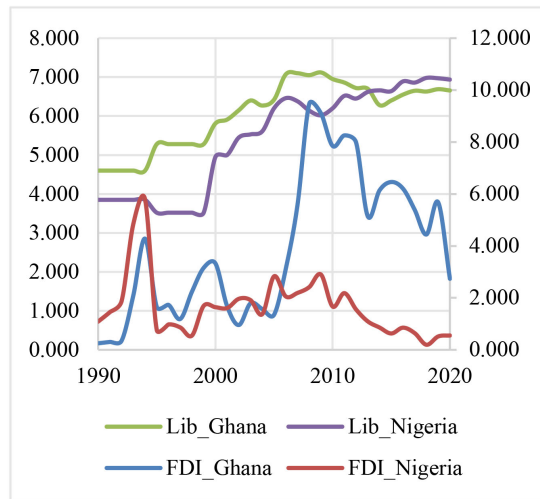


Figure 3. Evolution of economic freedom and FDI in Ghana and Nigeria from 1990-2020. Source: Data from WDI and the Heritage Foundation.

Figure 4 shows the simultaneous evolution of the corruption control index and the share of foreign direct investment in GDP from 1990 to 2020 for Ghana and Nigeria. When the corruption score moves towards -2.5 this implies that there is less control and therefore individuals can get rich by corruption and when it tends towards $+2.5$ this is equivalent to more control of corruption. For example, there is a higher corruption control index in Ghana than in Nigeria over the study period, which means that Ghana has better corruption control than Nigeria. Looking at foreign direct investment as a percentage of GDP, Ghana performs better than Nigeria.

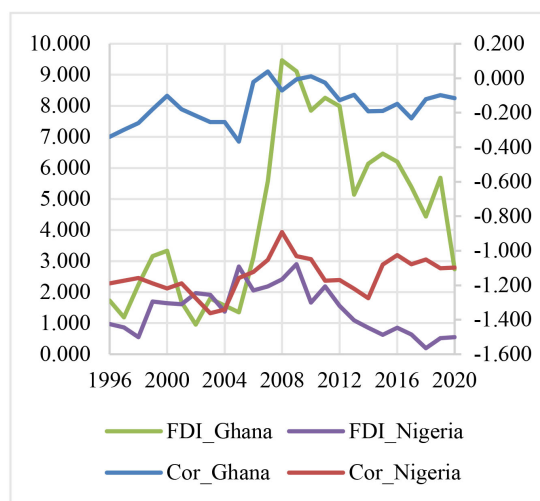


Figure 4. Evolution of FDI and corruption in Ghana and Nigeria from 1996-2020. Source: Data from WDI and the Heritage Foundation.

The Figures show that in Nigeria between 1999 and 2014, Corruption Control Index and *fdi* moved in the same direction. However, they moved in opposite directions outside that period. With respect to Ghana, it is observed that the two variables evolved broadly in the same direction, indicating a possible link between corruption control and *fdi*.

Figure 5 shows the evolution of economic freedom and foreign direct investment from 1990 to 2020 in Côte d'Ivoire and Senegal. We observe a similar trend for both economic freedoms, with a slightly higher level for Senegal. As for foreign direct investment, Senegal is on an upward trend, while Côte d'Ivoire is on a downward trend. The Figures show that economic freedom and foreign direct investment are moving in the same direction. We can therefore say that an improvement in economic freedom can positively impact the level of foreign direct investment.

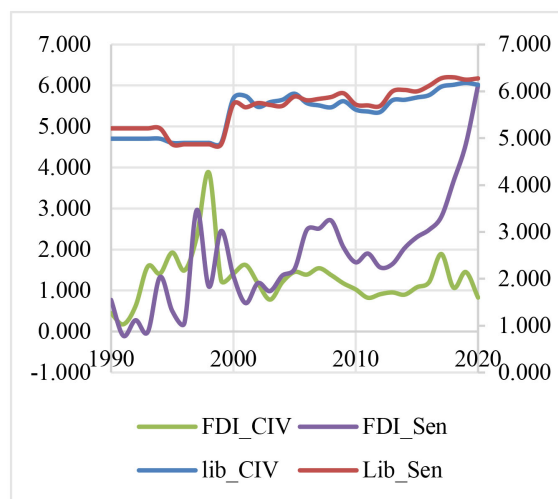


Figure 5. Evolution of economic freedom and FDI in Côte d'Ivoire and Sénégal from 1990-2020. Source: Data from WDI and the Heritage Foundation.

Figure 6 shows the trend of the corruption control index and foreign direct investment. The trend for the corruption index is similar in both countries with more control in Senegal than in Côte d'Ivoire. Between 1996 and 2010, there was less corruption control in Senegal than Côte d'Ivoire. But as of 2010, the establishment of several anti-corruption structures such as the High Authority for Good Governance in Côte d'Ivoire and the National Anti-Fraud and Anti-Corruption Office in Senegal helped reduce the level of corruption in these two countries. However, it should be noted that more efforts are needed to achieve a better control of corruption i.e. close to +2.5.

We can observe that corruption and foreign direct investment move in the same direction. We could thus say that an improvement in the fight against corruption can positively impact the level of foreign direct investment.

Figure 7 illustrates the corruption-*fdi* trends in Burkina Faso and Benin from

1996 to 2020. It is evident that the trends in both countries exhibit similarities, with corruption in Burkina Faso surpassing that in Benin in 2013. Throughout the entire study period, Burkina Faso displayed a greater level of intensity in combating corruption compared to Benin. However, the corruption control index was lower from 1996 to 2013 but exhibited improvement thereafter. It is noteworthy that both economies experienced an increase in the share of foreign direct investment in GDP over the study period, albeit at a substantial pace (Figure 8). Additionally, it is observed that the economic freedom index and foreign direct investment evolve similarly in both countries. Thus, it can be inferred that enhancements in economic freedom can potentially have a positive impact on the level of foreign direct investment.

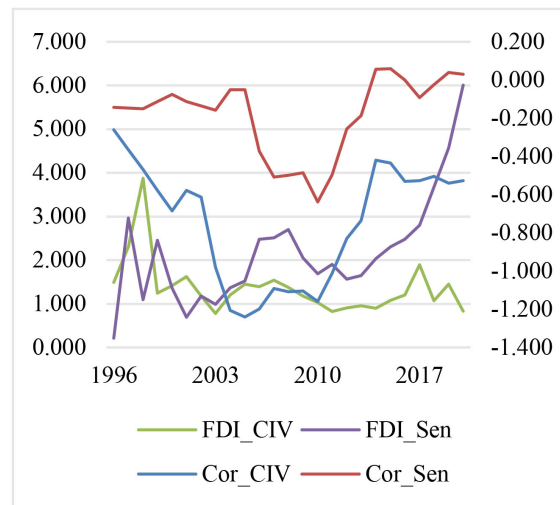


Figure 6. Evolution of FDI and corruption in Côte d'Ivoire and Sénégal from 1996-2020. Source: Data from WDI and the Heritage Foundation.

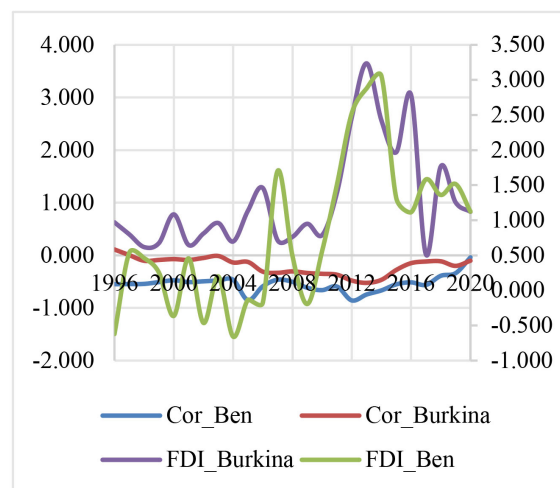


Figure 7. Evolution of FDI and corruption in Burkina Faso and Benin from 1996-2020. Source: Data from WDI and the Heritage Foundation.

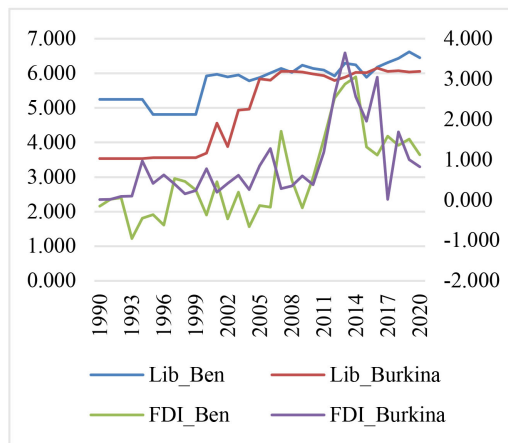


Figure 8. Evolution of economic freedom and FDI in Burkina Faso and Benin from 1990-2020. Source: Data from WDI and the Heritage Foundation.

Figure 9 presents the dynamic relationship between foreign direct investment and economic freedom. The corruption curves exhibit comparable patterns in both economies. Furthermore, it is evident that the fight against corruption is more vigorous in Togo compared to Guinea, although the level of control remains low in both economies. Regarding the curves representing foreign direct investment, their trajectory displays fluctuations throughout the entire period. These irregular patterns do not provide sufficient evidence to establish a direct linkage between corruption and foreign direct investment in the two economies.

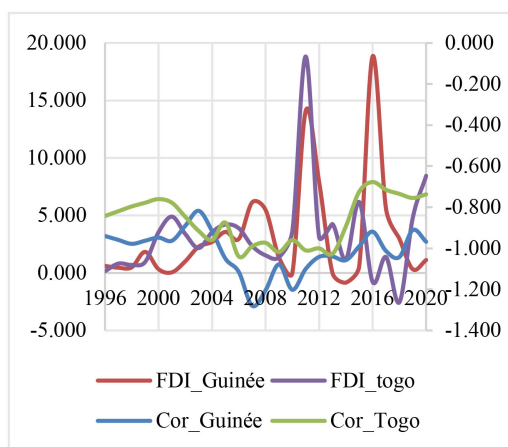


Figure 9. Evolution of FDI and corruption in Guinea and Togo from 1996-2020. Source: Data from WDI and the Heritage Foundation.

Upon reviewing the economic freedom curves in both economies, a similar trend is discernible, with Benin displaying a slightly higher level of economic freedom (**Figure 10**). Analyzing the economic freedom curve alongside the foreign direct investment curve reveals a relationship between these variables. It can be inferred that greater economic freedom has the potential to attract foreign direct

investment, while the converse may also hold true when the economic freedom index is low.

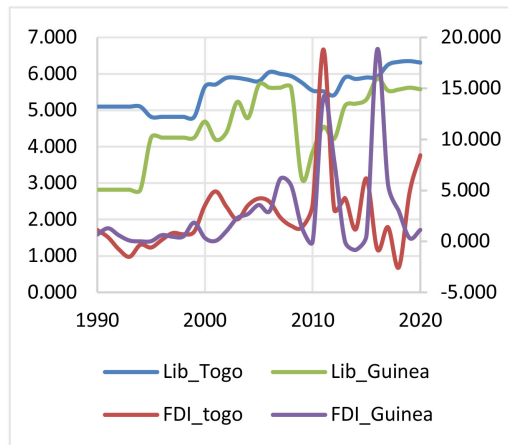


Figure 10. Evolution of economic freedom and FDI in Guinea and Togo from 1990-2020. Source: Data from WDI and the Heritage Foundation.

Figure 11 depicts the concurrent dynamics of the economic freedom index and foreign direct investment in Liberia and Sierra Leone between 1990 and 2010. The corruption curves reveal that Sierra Leone exhibits a stronger anti-corruption stance compared to Liberia, with an upward trend in corruption control observed. In the case of Liberia, the curve suggests an improvement in the fight against corruption from 2000 to 2007, followed by a decline in corruption control after 2007.

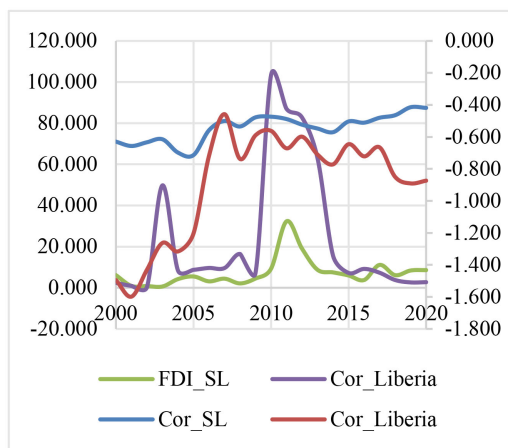


Figure 11. Evolution of FDI and corruption in Sierra Leone and Liberia from 2000-2020. Source: Data from WDI and the Heritage Foundation.

Furthermore, a connection between corruption and foreign direct investment is evident. A higher level of corruption correlates with a larger proportion of foreign direct investment in relation to GDP, and vice versa.

In **Figure 12**, the curves for economic freedom and foreign direct investment

align in the same direction. This implies that an increase in the economic freedom index serves as a significant factor in enhancing the attractiveness of foreign direct investment.

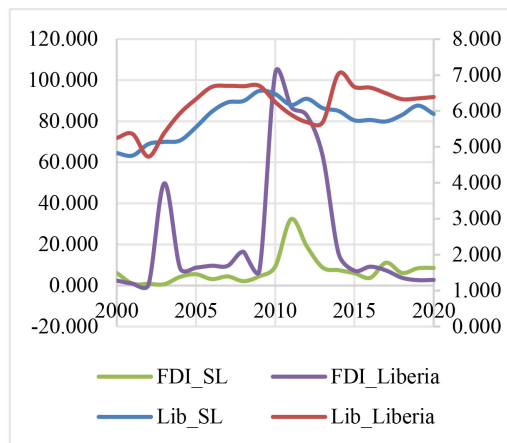


Figure 12. Evolution of economic freedom and FDI in Sierra Leone and Liberia from 2000-2020. Source: Data from WDI and the Heritage Foundation.

In **Figure 13**, we observe the simultaneous evolution of the economic freedom index and the share of foreign direct investment in GDP in Niger and Mali from 1990 to 2020. Both economies exhibit a low corruption control index, with Niger’s slightly higher than that of Mali. The curves representing corruption control and the share of foreign direct investment in GDP demonstrate a similar movement, suggesting a positive association between corruption control and the attractiveness of foreign direct investment.

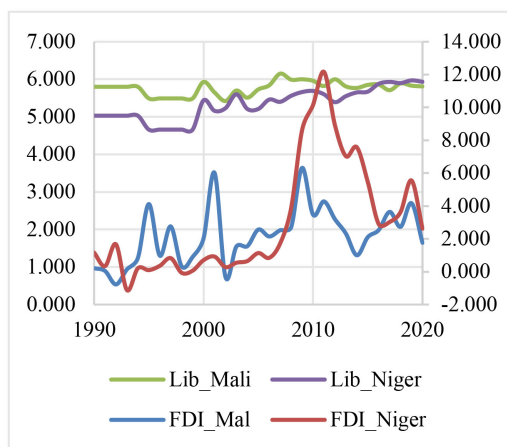


Figure 13. Evolution of economic freedom and FDI in Niger and Mali from 1990-2020. Source: Data from WDI and the Heritage Foundation.

Regarding the index of economic freedom, **Figure 14** illustrates an upward trend in the economic freedom curves. However, due to the shape of the curves,

it is difficult to establish a direct link between the economic freedom index and foreign direct investment.

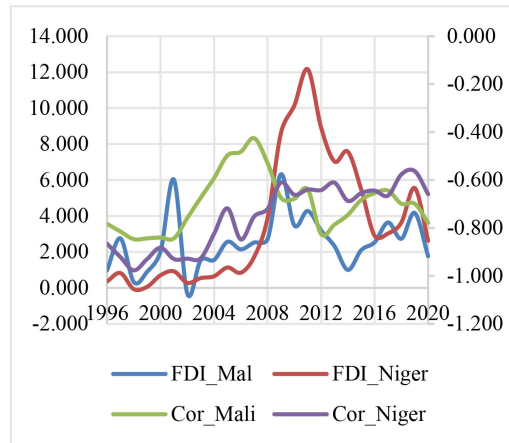


Figure 14. Evolution of FDI and corruption in Mali and Niger from 1996-2020. Source: Data from WDI and the Heritage Foundation.

Figure 15 illustrates the evolution of the economic freedom index and foreign direct investment for Guinea Bissau and Cape Verde from 1990 to 2020. It is evident that both economies have experienced a similar trend in the level of economic freedom, with Cape Verde exhibiting a higher degree of economic freedom compared to Guinea Bissau. In terms of foreign direct investment, there has been a fluctuating pattern with an overall upward trend throughout the study period for both economies. However, it is worth noting that Cape Verde has attracted a higher amount of foreign direct investment compared to Guinea Bissau.

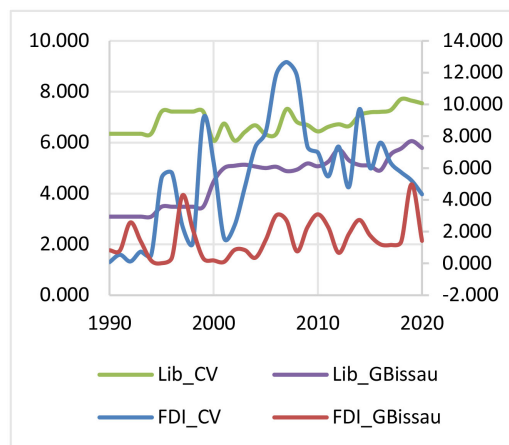


Figure 15. Evolution of economic freedom and FDI in Cabo Verde and Guinea Bissau from 1990-2020. Source: Data from WDI and the Heritage Foundation.

Turning to **Figure 16**, it presents the evolution of the corruption control index and foreign direct investment in Guinea Bissau and Cape Verde. It becomes

apparent that Cape Verde has implemented a stricter control of corruption compared to Guinea Bissau. Cape Verde's corruption control index maintains a value above zero, while Guinea Bissau's index remains consistently low and below zero throughout the entire study period. The observation of the curves does not reveal a common evolution between the two variables.

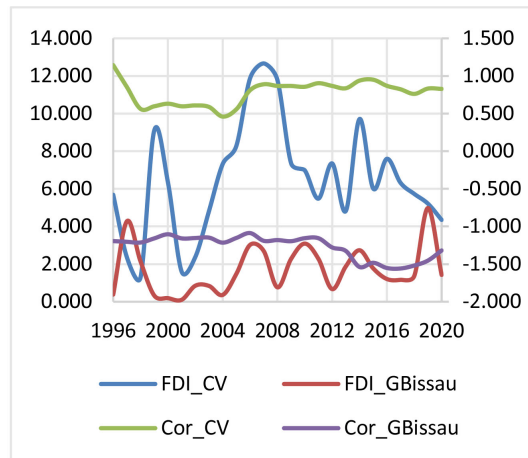


Figure 16. Evolution of FDI and corruption in Cabo Verde and Guinea Bissau from 1996-2022. Source: Data from WDI and the Heritage Foundation.

Figure 17 depicts the historical progression of economic freedom and corruption control in The Gambia between 1966 and 2020. The available data highlights that corruption control in The Gambia remains relatively low, consistently ranking below 0, which is also consistent with other ECOWAS nations. Between 1998 and 2004, both the corruption control index and foreign direct investment (*fdi*) exhibited a parallel movement. However, from 2004 onwards, their trends diverged, indicating an inverse relationship.

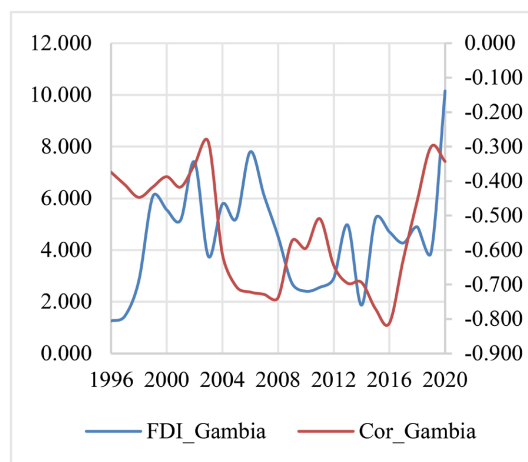


Figure 17. Evolution of FDI and corruption in Gambia from 1996-2022. Source: Data from WDI and the Heritage Foundation.

Moving on to **Figure 18**, it portrays the trajectories of economic freedom and *fdi* as a percentage of GDP in The Gambia spanning from 1990 to 2020. Notably, an overarching observation can be made that economic freedom and *fdi* generally align in their movements, showcasing a positive correlation.

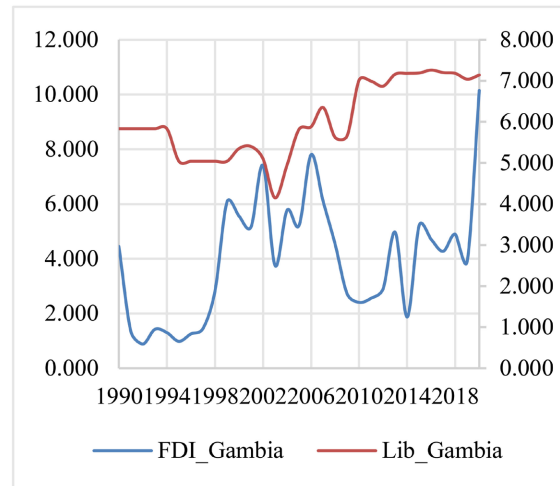


Figure 18. Evolution of economic freedom and FDI in Gambia from 1990-2020. Source: Data from WDI and the Heritage Foundation.

3. Review of Selected Literature

3.1. Theoretical Review

Theoretically speaking, the relationship between *fdi* and economic freedom is often derived from the principles of classical, neoclassical economics, and theories of international trade and investment. Adam Smith's (1776) (Smith, 1937) i.e. the Wealth of Nations laid the groundwork for understanding the benefits of free trade and economic freedom. He emphasized the role of markets, free competition, and limited government intervention in promoting economic growth and development. He argued that free trade and economic freedom are crucial for economic development and prosperity. Hence the need for an economic system based on the division of labor, specialization, and voluntary exchange, wherein individuals and nations can pursue their self-interests within a framework of rules and regulations. He believed that economic freedom, including the absence of excessive government intervention, protection of property rights, and free competition, would lead to economic growth and improvement in living standards. Thus, allowing individuals to freely pursue their own interests would result in the most efficient allocation of resources, as the pursuit of self-interest would naturally lead to societal welfare (the concept of the invisible hand). Smith's ideas provided a theoretical foundation for the argument that countries with high levels of economic freedom are more likely to attract *fdi* by offering a conducive business environment and the potential for higher profits.

According to neoclassical economic theory, *fdi* is driven by the pursuit of higher

profits. Investors are attracted to countries with strong economic freedom, as they perceive that such countries provide a conducive environment for conducting business and making profits. Economic freedom encompasses factors like low government intervention, protection of property rights, ease of doing business, and absence of excessive regulations.

The theory of international trade and investment also supports the relationship between *fdi* and economic freedom. It argues that countries with liberalized trade policies and open markets tend to attract more *fdi*. These policies promote competition, efficiency, and market access, which in turn attract foreign investors seeking to tap into new markets or take advantage of comparative advantages.

Other scholars, who provided to some extent theoretical foundations to economic freedom and *fdi* nexus, include but not limited to Coase (1937), Hayek (1944), and Gwartney et al. (1996). Coase's work (Coase, 1937) shed light on the importance of an efficient legal and institutional framework in facilitating economic transactions and attracting *fdi*. His analysis of transaction costs is relevant to the relationship between *fdi* and economic freedom. Indeed, when considering *fdi*, firms may choose to establish foreign subsidiaries or invest directly in foreign countries when the transaction costs associated with conducting business in a foreign market are lower than the costs of utilizing arm's length transactions. Economic freedom plays a significant role in reducing these transaction costs by creating an environment with clear property rights, enforceable contracts, and minimal bureaucratic hurdles. Coase also highlighted the importance of property rights. He argued that establishing clear and protected property rights provides individuals and firms with the necessary incentives to invest, innovate, and engage in economic activities. Thus, economic freedom, which includes the protection of property rights, is crucial for attracting foreign investment. When investors have confidence that their property rights will be respected and enforced, they are more likely to engage in *fdi* and contribute to economic development. Hence, by reducing the potential risks and costs associated with engaging in economic activities, economic freedom incentivizes foreign investors and fosters an environment conducive to *fdi*-driven economic growth.

Hayek (1944), in his book "The Road to Serfdom", he warned against the dangers of excessive government intervention and centralized economic planning which could lead to loss of individual freedom and economic inefficiency. His contributions to the understanding of *fdi* and economic freedom can be seen in his recognition of the role of entrepreneurship, innovation, and competitive markets where he argued that economic freedom fosters an environment that encourages entrepreneurship, as individuals are free to pursue their own ideas and initiatives. This, in turn, leads to increased investment, productivity, and economic growth. Hayek's ideas align with the notion that economic freedom positively influences *fdi*. A country that protects property rights, upholds the rule of law, and minimizes government intervention is likely to provide a stable and favorable investment climate. By promoting individual liberty and free markets, Hayek

supported the argument that economic freedom is conducive to attracting *fdi* and fostering economic growth.

Gwartney et al. (1996) and his co-authors Robert Lawson and Joshua Hall, developed the Economic Freedom Index, known as the Economic Freedom of the World (*EFW*) Index, which measures economic freedom and its impact on economic growth and development. Their work on the *EFW* Index and subsequent research shed light on the relationship between economic freedom and *fdi*. They showed that countries with higher levels of economic freedom tend to attract more *fdi* inflows. This is because economic freedom creates a conducive environment for businesses by offering stability, property rights protection, low levels of corruption, ease of doing business, and minimal government intervention. Gwartney's contributions have helped establish a robust empirical basis for understanding the relationship between *fdi* and economic freedom. Through the *EFW* Index and related research, he has provided policymakers, researchers, and investors with valuable insights into the importance of economic freedom and its role in attracting *fdi* and fostering economic development.

Overall, the above scholars have provided a clear foundation for the relationship between economic freedom and foreign direct investment. This foundation has also led to increased empirical investigations.

3.2. Foreign Direct Investment and Economic Freedom

The empirical literature on the relationship between economic freedom and *fdi* attractiveness provides mixed findings and highlights the importance of considering different factors and contexts.

Fofana (2014) highlighted the importance of institutional variables of economic freedom in attracting *fdi* in both sub-Saharan Africa and Western Europe, whereas Naanwaab and Diarrassouba (2016) showed that economic freedom was a significant factor for *fdi* in high- and middle-income countries but not in low-income countries. Taran et al. (2016) found that the degree of economic freedom, specifically fiscal freedom, public expenditure, monetary, commercial, and financial freedom, was an important determinant of *fdi*, especially in economically and politically stable European countries. They found that economic freedom was an important determinant of *fdi* attractiveness. Moreover, Barua and Naym (2017) found that electricity availability, economic freedom, and *GDP* had a positive impact on *fdi* inflows in 81 countries. Sovbetov (2017) found that economic freedom had a positive and significant effect on *fdi* in European countries, sub-Saharan Africa, and Oceanian countries. Aziz (2018) showed that economic freedom, ease of doing business, and international country risk had a positive and significant impact on *fdi* inflows in Arab economies. Sooreea-Bheemul et al. (2020) found that a high degree of economic freedom, specifically effectiveness of regulation, fiscal freedom, market opening, market size, commercial openness, and a good telecommunications network, are the main factors attracting *fdi* in sub-Saharan Africa.

Overall, these studies indicate that economic freedom plays a role in attracting *fdi*, but the specific variables and their impacts can vary across different regions and income levels. It is important to consider other factors such as infrastructure availability, market size, and institutional quality when analysing the relationship between economic freedom and *fdi* attractiveness.

In as much as *fdi* is a share of total investment in a country, factors that affect *fdi* would inevitably affect economic growth. The effects of economic freedom on economic growth were investigated by Leite, Carvalho Lucio and Ferreira (2019), Hooper (2019) and Fernandes-Maciél, De-Gamboa and Garcia-Alves (2022). This is however beyond the scope of our investigation.

4. Data and Method of Analysis

4.1. Data

The dataset consists of a panel of 13 ECOWAS countries, covering the period 1996-2020. The choice of countries is mainly dictated by the availability of data over the period considered. Thus, Cabo Verde and Liberia were excluded. The index of economic freedom is taken from the Heritage Foundation database; and other variables such *GDP* per capita (*gdpkc*), credit supply (*cred*), urbanization (*urb*) and foreign direct investment (*fdi*) are obtained from the world development indicators. Given the weight and importance of Nigeria in the ECOWAS region, we will conduct our analysis with and without Nigeria to see if there would be any difference in the results.

4.2. Method of Analysis

4.2.1. Model Construction

Many studies have examined the relationship between foreign direct investment (FDI) and economic freedom, with mixed results. Existing literature has explained the various determinants of FDI, but little attention has been paid to the role of economic freedom as a significant factor in West African countries. To determine the impacts of economic freedom on FDI in ECOWAS, we use a model inspired by Salisu and Isah (2017) and Nkoa and Song (2018). The general model is as follows:

$$fdi = f(ecofree, gdpkc, cred, urb) \quad (1)$$

We have included *GDP* per capita, credit to the private sector and urbanization as control variables. All variables were transformed as natural logarithms. The model to be estimated is given below:

$$\ln fdi_{it} = \beta_0 + \beta_1 \ln ecofree_{it} + \beta_2 \ln gdpkc_{it} + \beta_3 \ln cred_{it} + \beta_4 \ln urb_{it} + \varepsilon_{it} \quad (2)$$

where *t* and *i* denote the period studied and the number of countries, respectively. The variable *fdi* refers to foreign direct investment, *ecofree* to economic freedom, *gdpkc* is *GDP* per capita, *cred* is credit to the private sector, *urb* is urbanization and ε_{it} is the random error. Given that we are in a panel data setting, it is important to check for cross-sectional dependence.

4.2.2. Cross-Sectional Dependency

The ECOWAS countries have certain characteristics in common due to their economic association. Thus, observations could be influenced by some common considerations (common factors with heterogeneous factor loading) and hence the likely existence of cross-sectional dependence. As argued by O'Connell (1998), the presence of cross-sectional dependence (hereafter *CD*) may affect the finite sample behavior of the unit root test which subsequently leads to incorrect decision. Moreover, according to Philips and Sul (2003) the presence of a *CD* may deteriorate the asymptotic distribution of the standard unit root test which is normally distributed. It is hence trivial that ignoring *CD* of errors can have serious consequences (Pesaran et al., 2013). We therefore started our analysis with an assessment of the existence of *CD*. Given the dimension of our panel data ($T > N$) we followed Pesaran (2004) and used the following general panel data model:

$$y_{it} = \alpha_i + \beta_i' x_{it} + \mu_{it}. \quad (3)$$

With $i = 1, 2, 3, \dots, N$; $t = 1, 2, 3, \dots, T$. Where i and t are the cross section and time series dimensions respectively, x_{it} is a $k \times 1$ vector of observed time varying regressors. The intercept and the slope coefficients (α_i and β_i) are allowed to vary across i . For each i , $u_{it} \sim IID(0, \sigma_u^2)$ for all t although they can be cross-sectionally correlated (Pesaran, 2004). The appropriate tests for cross-sectional dependence are proposed by Breusch and Pagan (1980), Pesaran (2004) and Pesaran et al. (2008). These tests are based, under the null hypothesis (H_0) of no cross-section dependence i.e. $(u_{it}, u_{jt}) = 0$, for all $i \neq j$, on a Lagrange Multiplier (*LM*) statistic given by:

$$CD_{LM} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij}^2. \quad (4)$$

where $\hat{\rho}_{ij}$ is the sample estimate of the pairwise correlation of the residuals and is given by the following formulae:

$$\hat{\rho}_{ij} = \hat{\rho}_{ji} = \frac{\sum_{t=1}^T \hat{\mu}_{it} \hat{\mu}_{jt}}{\left(\sum_{t=1}^T \hat{\mu}_{it}^2\right)^{1/2} \left(\sum_{t=1}^T \hat{\mu}_{jt}^2\right)^{1/2}}, \text{ and } \hat{\mu}_{it} \text{ is the OLS estimate of } \mu_{it} \text{ defined}$$

$$\text{by: } \hat{\mu}_{it} = y_{it} - \hat{\alpha}_i - \hat{\beta}_i' x_{it}$$

The statistics in Equation (4) i.e., CD_{LM} , is asymptotically distributed as chi-squared with $N(N-1)/2$ degree of freedom. The assumption of the above test is that N is constant, and T is large ($\rightarrow \infty$). However, Pesaran (2004) proposed that when both N and T are large ($N \rightarrow \infty$ and $T \rightarrow \infty$), the following test be used:

$$CD_{LM1} = \sqrt{\frac{1}{N(N-1)}} \left[\sum_{i=1}^{N-1} \sum_{j=i+1}^N T \hat{\rho}_{ij} \right] \rightarrow N(0,1). \quad (5)$$

Pesaran et al. (2008) proposed also a biased-adjusted version of the Breusch and Pagan (1980) *CD* test as follows:

$$CD_{LMadj} = \frac{1}{CD_{LM}} \left[\frac{(T-k) \rho_{ij}^2 \mu T_{ij}}{\sqrt{V_{ij}^2}} \right] \rightarrow N(0,1). \quad (6)$$

In the absence of *CD*, the usual panel data unit root tests known as first

generation panel unit root test are applied. These tests are the one developed by Levin et al. (2002), Breitung (2000), Im et al. (2003), Hadri (2000) and Maddala and Wu (1999). In the presence of *CD*, it is recommended to use second generation panel unit root tests. According to Hurlin and Mignon (2007), these tests relax the cross-sectional independence assumption by specifying the cross-sectional dependencies. The various methods proposed could be grouped into two where in the first one, the cross-sectional dependencies are specified as a common factor model (Bai & Ng, 2004; Phillips & Sul, 2003; Moon & Perron, 2004). In the second group restrictions are imposed on the covariance matrix of residuals.

4.2.3. Unit Root Test

Given the time series nature of the data, it is important to investigate their characteristics. The best way to do that is through unit root tests. However, due to the possibility of cross-sectional dependence, stationary tests based on first-generation tests are not appropriate because they do not consider the cross-sectional dependence nature of the data. The best approach is to use second generation unit root tests developed by Pesaran (2007) i.e., Cross-sectional Augmented Dickey Fuller (CADF), and the Cross-sectional Im-Pesaran-Shin (CIPS) unit root tests (Kouton, 2019). The CADF test is estimated using standard Dickey-Fuller regression. The test is conducted through the estimation of the equation below using OLS:

$$\Delta y_{it} = \alpha_i + \beta_i y_{it-1} + \delta_i y_{it-1} + \sum_{j=0}^k \delta_{ij} \Delta y_{it-j} + \sum_{j=0}^k \Delta y_{it-j} + \varepsilon_{it}. \quad (7)$$

In Equation (7), y_{t-1} and Δy_{t-1} express the cross-sectional means of the lag and first difference respectively, for each cross-sectional unit. In contrast, CIPS statistics refer to the average of separate CADF statistics as follows:

$$\text{CIPS} = \frac{1}{N} \sum_{i=1}^N t_i (N * T). \quad (8)$$

The CADF and CIPS tests follow the null hypothesis of identical unit root, and the alternative is that at least one unit in the panel is stationary. The unit root tests not only determine whether the shocks *fdi*, *ecofree*, *gdpkc*, *cred* and *urb* are permanent or temporary, but also provide suggestions on how to decompose the variables. Stationary variables suggest that economic freedom, *gdp* per capita, credit and urbanization will have a temporary impact. However, in the case of unit roots, a long-term association could exist between the series, and any disturbance to the system will have temporary effects. On the contrary, any external shock will have lasting effects and should be noted in the absence of cointegration.

4.2.4. Analysis of Asymmetric Cointegration

Cointegration tests are essential to ascertain long run dynamics. However, cointegration could be hidden if not properly tested for especially in panel data. This could be an indication of asymmetric cointegration. Hence, before testing for asymmetric cointegration, one must test for linear cointegration. It should also be noted that *CD* could be an issue that needs to be addressed when testing for

cointegration. To avoid CD-related issues, we implemented cointegration test of [Westerlund \(2007\)](#) which controls for CD in panel data settings and uses an error-correction model to assess whether the series are cointegrated.

The new panel hidden cointegration is used to assess asymmetric cointegration ([Hatemi-J, 2020](#)). Hidden cointegration tests the long-term relationship between the negative and positive elements of the series. It assumes the absence of cointegration in the original form of the variables and estimates that cointegration occurs between the hidden parts, i.e., the positive and negative elements. This may be due to the existence of potential hidden dynamics in a non-cointegrated association that push the components of the series instead of the series itself.

The tests were carried out according to the following procedure: First, we confirm whether the series contains unit roots. The [Hatemi-J \(2020\)](#) test assumes that the series is stationary in first difference. We then evaluate the following equations using the variables specific to our study:

$$Y_{it}^+ = \alpha_i^+ + \beta_{1i}^+ ecofree_{it}^+ + \beta_{2i}^+ gdpkc_{it}^+ + \beta_{3i}^+ cred_{it}^+ + \beta_{4i}^+ urb_{it}^+ + \varepsilon_{it}^+; \tag{9}$$

$$Y_{it}^- = \alpha_i^- + \beta_{1i}^- ecofree_{it}^- + \beta_{2i}^- gdpkc_{it}^- + \beta_{3i}^- cred_{it}^- + \beta_{4i}^- urb_{it}^- + \varepsilon_{it}^-; \tag{10}$$

where Y corresponds to foreign direct investment IDE . [Hatemi-J \(2014\)](#) decomposed the variable as follows:

$$\begin{aligned} Y_{it}^+ &= \sum_{k=1}^t \Delta Y_{ik}^+ = \sum_{k=1}^t \max(\Delta Y_{it}, 0); \\ Y_{it}^- &= \sum_{k=1}^t \Delta Y_{ik}^- = \sum_{k=1}^t \min(\Delta Y_{it}, 0). \end{aligned} \tag{11}$$

In addition, [Hatemi-J \(2014\)](#) used a similar decomposition for each explanatory variable:

$$\begin{aligned} X_{it}^+ &= \sum_{k=1}^t \Delta X_{ik}^+ = \sum_{k=1}^t \max(\Delta X_{it}, 0); \\ X_{it}^- &= \sum_{k=1}^t \Delta X_{ik}^- = \sum_{k=1}^t \min(\Delta X_{it}, 0). \end{aligned} \tag{12}$$

We can also analyze the [Hatemi-J \(2020\)](#) test by specifying the following combinations: (Y_{it}^+, X_{it}^+) and (Y_{it}^-, X_{it}^-) . Finally, the residuals ε_{it}^+ and ε_{it}^- must be stationary to allow cointegration of the series. To meet this requirement, this study uses the [Pesaran \(2007\)](#) unit root test.

4.2.5. Non-Linear ARDL Panel Model

The existing literature has used linear structure, i.e., several works have used the ARDL specification to examine linear structure. First, we incorporate non-linear effects using a single equation from model of [Shin \(2014\)](#) in the panel framework ([Kouton, 2019](#)). The procedure is as follows:

$$\begin{aligned} \Delta Y_{it} &= \alpha_0 + \alpha_1 Y_{it-1} + \alpha_2^+ ecofree_{it-1}^+ + \alpha_2^- ecofree_{it-1}^- + \alpha_3^+ gdpkc_{it-1}^+ \\ &\quad + \alpha_3^- gdpkc_{it-1}^- + \alpha_4^+ cred_{it-1}^+ + \alpha_4^- cred_{it-1}^- + \alpha_5 urb_{it} + \sum_{k=1}^p \beta_k \Delta Y_{it-k} \\ &\quad + \sum_{k=1}^{q1} (\gamma_k^+ \Delta ecofree_{it-k}^+ + \gamma_k^- \Delta ecofree_{it-k}^-) \\ &\quad + \sum_{k=1}^{q2} (\delta_k^+ \Delta gdpkc_{it-k}^+ + \delta_k^- \Delta gdpkc_{it-k}^-) \\ &\quad + \sum_{k=1}^{q3} (\omega_k^+ \Delta cred_{it-k}^+ + \omega_k^- \Delta cred_{it-k}^-) + \sum_{k=1}^{q4} \chi_k \Delta urb_{it-k} + \mu_i + \varepsilon_{it} \end{aligned} \tag{13}$$

where p and q are the lag orders, u_i is the country specific effect, et ε_{it} is the

standard error term. The coefficients α_2^+ , α_2^- , α_3^+ , α_3^- , α_4^+ , α_4^- , α_5 et γ_k^+ , γ_k^- , δ_k^+ , δ_k^- , ω_k^+ , ω_k^- , χ_5 measure long-run and short-run asymmetries respectively. The cointegration association is verified by testing the null hypothesis of “non-cointegration” given by:

$$H_0 : \alpha_1 = \sum_{i=2}^5 \alpha_i^+ = \sum_{i=2}^5 \alpha_i^- = 0. \quad (14)$$

Equation (13) is expressed in an error correction system as follows:

$$\begin{aligned} \Delta Y_{it} = & \alpha_0 + \rho \varepsilon_{it-1} + \sum_{k=1}^p \beta_k \Delta Y_{it-k} + \sum_{k=0}^{q1} (\gamma_k^+ \Delta ecofree_{it-k}^+ + \gamma_k^- \Delta ecofree_{it-k}^-) \\ & + \sum_{k=0}^{q2} (\delta_k^+ \Delta gdpc_{it-k}^+ + \delta_k^- \Delta gdpc_{it-k}^-) \\ & + \sum_{k=0}^{q3} (\omega_k^+ \Delta cred_{it-k}^+ + \omega_k^- \Delta cred_{it-k}^-) + \sum_{k=0}^{q4} (\chi_k \Delta urb_{it-k}) + \mu_i + \varepsilon_{it} \end{aligned} \quad (15)$$

where ε_{it-1} represents the long-run equilibrium in the non-linear ARDL panel model, ρ designates the velocity adjustment parameter that evaluates the time required for a system to reach long-run equilibrium. We use the PMG method for estimation as it provides homogeneous long-run and heterogeneous short-run coefficients for all countries (Bangake & Eggoh, 2012). The economic justifications for using the PMG method are that, given the heterogeneity, the correlation between economic freedom (*ecofree*), GDP per capita (*gdpc*), credit supply (*cred*), urbanization (*urb*) and foreign direct investment (*fdi*) may be different for each short-run cross-section. However, the same behavior is plausible for the association of these variables in the long term. Therefore, highlighting that those other methods, such as FMOLS and DOLS, can be used to estimate the cointegration association. However, these methods only analyze the long-term association between series and cannot capture short-term dynamics. This notion reinforces the fact that the PMG method is appropriate for the current study.

5. Empirical Results and Discussion

The empirical results are analyzed as follows: first, we present the dependency results and the unit root test. Secondly, we present the analysis of the non-linear cointegration test. Thirdly, the results of the linear and non-linear panel ARDL model are presented.

5.1. Cross-Sectional Dependence and Unit Root Tests

We examine the CD test to determine the appropriate unit root test. **Table 1** shows the results of the CD test. For each of the variables, the *p-value* associated with the *CD test* is 0.000, which is less than the 5% significance level. These results suggest the existence of cross-sectional dependence in the sample of ECOWAS economies and imply that the null hypothesis of “no dependence” is rejected.

Furthermore, the results confirm that the effect of a shock originating from any country in the panel also influences other countries, due to the interconnection of world economies through globalization. Having confirmed the existence of CD, we apply the CIPS and CADF unit root tests of Pesaran (2007), which allow for dependence and serial correlation. In addition, both tests provide indications of

series heterogeneity while testing for unit root. The results are presented in **Table 2**. These results reveal that for variables *fdi*, *ecofree* and *urb* the test statistics are significant in levels at 1%. This is so for both the CIPS and CADF tests Thus they are I(0). For the remaining variables (*gdpc* and *urb*) they are I(1). We can proceed with the asymmetric cointegration of **Hatemi-J (2020)** to observe the long-term association between the selected variables. The above results also indicate that the initial requirement for nonlinear panel ARDL estimation has been met. Next, we verify that none of the variables is I(2).

Table 1. Tests of cross-sectional dependence.

Variable	CD test	P-value	Corr	abs(corr)
<i>fdi</i>	3.92	0.000	0.091	0.264
<i>ecofree</i>	30.76	0.000	0.711	0.711
<i>gdpc</i>	22.64	0.000	0.523	0.650
<i>cred</i>	1758	0.000	0.406	0.473
<i>urb</i>	41.60	0.000	0.961	0.961

Notes: Under the null hypothesis of cross-sectional independence, $CD \sim N(0, 1)$. Source: Authors' calculations with data from WDI, WGI and Heritage Foundation.

Table 2. Unit root test.

Variables	Level		1 st difference		Order of integration
	Intercept	Intercept and trend	Intercept	Intercept and trend	
Pesaran CIPS					
<i>fdi</i>	-4.572***	-3.281***	-	-	I(0)
<i>ecofree</i>	-2.538***	-0.764	-	-14.020***	I(0)
<i>gdpc</i>	2.440	-1.225	-12.550***	-11.434***	I(1)
<i>cred</i>	-0.647	-2.730***	-14.462***	-	I(0)
<i>urb</i>	-1.296	4.497	1.246***	1.326***	I(1)
Pesaran CADF					
<i>fdi</i>	-2.912***	-3.053***	-	-	I(0)
<i>ecofree</i>	-2.393***	-2.569	-	-4.900***	I(0)
<i>gdpc</i>	-1.983	-2.383	-4.027***	-4.541***	I(1)
<i>cred</i>	-2.816***	-2.730*	-	-	I(0)
<i>urb</i>	-0.573	-1.995	-1.664***	-2.186***	I(1)

Significance level at *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Source: Authors' calculations with data from WDI, WGI and Heritage Foundation.

5.2. Asymmetric Cointegration Results

Cointegration is crucial to avoid spurious regressions in the presence of unit roots in the series (**Kouton, 2019**). The Westerlund panel cointegration test is used to

assess the long run dynamics among the variables (Table 3). All the *p-values* and *Robust P-values* indicate that the hypothesis of no cointegration cannot be rejected (the values are above the 1%, 5% and 10% probability levels).

Table 3. Westerlund’s panel cointegration test results.

Statistic	Value	Z-value	<i>P</i> -value	Robust <i>P</i> -value
Gt	-1.974	3.536	1.000	0.733
Ga	-0.343	7.099	1.000	1.000
Pt	-3.190	6.288	1.000	0.940
Pa	-0.408	5.645	1.000	0.997

Robust *p*-value are calculated by 300 bootstrap repetitions.

The absence of cointegration could be an indication that any shock to the system could have a lasting effect on the economy if the series are used in their original form. Consequently, observation of the shocks or volatility of *fdi*, *ecofree*, *gdpkc*, *cred*, and *urb*, is essential. We therefore proceed with the asymmetric cointegration test of Hatemi-J (2020) to observe the long-term association between the selected variables (Table 4).

Table 4. Hidden cointegration test results.

Variables	χ^2	<i>p</i> -value	Order of integration	Decision
(Y^+, X^+)	67.13	0.000	1(0)	Stationary
(Y^-, X^-)	42.90	0.000	1(0)	Stationary
(Y^+, X^-)	17.99	0.000	1(0)	Stationary
(Y^-, X^+)	66.47	0.000	1(0)	Stationary

Source: Authors’ calculations with data from WDI, WGI and Heritage Foundation. *Y* is economic freedom; *X* stands for all explanatory variables.

The *p*-values associated with the χ^2 statistic, are below the 1%, 5%, and 10% significance levels. The null hypothesis of no asymmetric cointegration is therefore rejected. This indicates strong evidence of asymmetric cointegration between the explained variable and the explanatory variables.

5.3. Linear Relationship between Foreign Direct Investment and Economic Freedom

Table 5 presents the linear impact of economic freedom on the inflow of foreign direct investment in the ECOWAS region. The results differ due to disparities in terms of institutions. Within ECOWAS, economic freedom has an asymmetrical effect on *fdi* in the short and long run, but not significantly so. Indeed, the coefficients associated with this variable in the short and long run are 0.435 and -1.016 respectively. In terms of control variables, *GDP* per capita and credit supply have positive and significant impact on *fdi* in the ECOWAS region in the long run but

not in the short run. The results are confirmed even when Nigeria is removed (Column for ECOWAS^(a)).

Table 5. Linear panel ARDL.

Dependent variable: <i>fdi</i> , Estimation method: PMG				
Variables	ECOWAS		ECOWAS ^(a)	
	Coefficient	Prob	Coefficient	Prob
Long run Asymmetry				
<i>ecofree</i>	0.435	0.120	0.335	0.290
<i>gdpgc</i>	2.405***	0.002	2.036**	0.017
<i>cred</i>	0.101***	0.000	0.128**	0.014
<i>urb</i>	-1.175*	0.061	-0.043	0.958
Short run Asymmetry				
<i>ecofree</i>	-1.016	0.113	-1.052	0.133
<i>gdpgc</i>	15.456	0.128	17.384	0.108
<i>cred</i>	0.018	0.802	0.006	0.934
<i>urb</i>	-25.173	0.217	-30.545	0.216
<i>ECT</i>	-0.760***	0.000	-0.740***	0.000
Constant	23.568***	0.006	-0.245	0.976
Log-likelihood	-481.771		-471.647	
Number of obs.	299.000		276.000	

Source: Authors' calculations with data from WDI, WGI and Heritage Foundation.

5.4. Non-Linear Relationship between Foreign Direct Investment and Economic Freedom

Within ECOWAS, the long run results presented in **Table 6**, indicated that a positive shock to economic freedom significantly reduced *fdi* to the tune of **0.913**. This result may look counter-intuitive. However, while economic freedom is generally associated with attracting *fdi*, there can be exceptions and caveats to this relationship. Indeed, even if a country implements positive reforms to enhance economic freedom, persistent political instability can undermine investor confidence. Political unrest, uncertainty, or frequent changes in leadership can discourage foreign investors from committing their capital. Hence, despite positive shocks to economic freedom, *fdi* will not increase. In addition, sudden and dramatic deregulation can sometimes create uncertainties. Investors may be concerned about potential risks and uncertainties arising from an inadequate regulatory framework, particularly in sectors where proper oversight is necessary to protect public interests. In other words, more positive shocks to economic freedom would have a negative impact on *fdi* flows (Li & Resnick, 2003; Levis, 1979).

Table 6. Nonlinear panel ARDL.

Dependent variable: <i>fdi</i> , Estimation method: <i>PMG</i>				
Variables	ECOWAS		ECOWAS ^(a)	
	Coefficient	Prob	Coefficient	Prob
Long run Asymmetry				
<i>ecofree</i> ⁺	-0.913***	0.000	-1.117***	0.000
<i>ecofree</i> ⁻	5.553***	0.000	6.090***	0.000
<i>gdpc</i> ⁺	-2.833***	0.008	-1.859*	0.093
<i>gdpc</i> ⁻	-5.698***	0.002	-7.086***	0.000
<i>cred</i> ⁺	0.442***	0.000	0.521***	0.000
<i>cred</i> ⁻	-0.093	0.342	-0.458***	0.003
<i>urb</i>	1.066	0.279	2.598***	0.007
Short run Asymmetry				
<i>ecofree</i> ⁺	1.034	0.180	1.150	0.237
<i>ecofree</i> ⁻	-4.995	0.235	-4.690	0.331
<i>gdpc</i> ⁺	22.475	0.151	23.048	0.158
<i>gdpc</i> ⁻	-7.095	0.680	-7.317	0.690
<i>cred</i> ⁺	0.028	0.807	-0.053	0.731
<i>cred</i> ⁻	0.126	0.542	0.257	0.245
<i>urb</i>	-29.835	0.158	-43.599	0.144
<i>ECT</i>	-0.712***	0.000	-0.717***	0.000
<i>Constant</i>	-17.681**	0.024	-54.261***	0.007
Log-likelihood	-435.069		-422.446	
Number of obs.	299.000		276.000	

Source: Authors' calculations with data from WDI, WGI and Heritage Foundation.

The results also indicated that a negative shock to economic freedom could have a positive effect on *fdi*. Indeed, a negative shock like a financial crisis or economic downturn can lead governments to privatize state-owned enterprises. This process often involves opening sectors to foreign investors, attracting *fdi* as foreign companies seek to acquire these privatized assets. Negative shocks such as political transitions or instability can lead to changes in government policies, including economic liberalization measures. If these reforms improve the investment climate and reduce barriers to entry for foreign investors, it could result in increased *fdi* inflows.

In addition to the above, it was found that in the long run both positive and negative shocks to per capita *GDP* had a negative impact on *fdi* (**-2.833** and **-5.698** respectively). Furthermore, the results suggested that positive shocks to credit increased *fdi* significantly (**0.442** and **0.521**) in all zones, while the negative shocks to credit exerted a non-significant reduction on *fdi*. When Nigeria is

excluded from the sample, negative shocks to credit had a negative impact on *fdi* (-0.458) while urbanization had a positive and significant effect (2.598). The short run effects are not significant.

6. Conclusion and Recommendations

The main objective of this paper is to contribute to a better understanding of the relationship between *fdi* and economic freedom. More specifically, the paper seeks to: 1) determine the impact of economic freedom in the ECOWAS region, 2) and the extent to which there are short and long run dynamics in this nexus. After an overview of the state of *fdi* and economic freedom in the ECOWAS region, the paper presented the theoretical underpinnings of the relationship between *fdi* and economic freedom. This was followed by a brief review of selected empirical literature. Afterward, the methods of analysis were presented i.e. panel ARDL. However, it was discovered that there was hidden cointegration, thus the use of a non-linear panel ARDL approach to better capture the hidden cointegration.

The results showed that within ECOWAS, in the long run, a positive shock to economic freedom significantly reduced *fdi* while a negative shock to economic freedom increased *fdi*. Moreover, in the long run both positive and negative shocks to per capita *GDP* had a negative impact on *fdi*. Furthermore, positive shocks to credit increased *fdi* significantly. When Nigeria is excluded from the sample negative shocks to credit had a negative impact on *fdi* while urbanization had a positive and significant effect on *fdi*.

Considering the above findings, it is recommended that a holistic approach be used when considering reforms to economic freedom. This is so because economic freedom alone may not be enough in the ECOWAS region to make a significant contribution to development via *fdi* if other factors are not brought into the development equation i.e. skills (quality of human capital) and infrastructure.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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